IN THE CLAIMS:

Complete Listing and Status of the Claims

1-118 Cancelled

119. (New) A method of treating stress urinary incontinence by repairing injured, damaged, or dysfunctional genitourinary tract tissue, comprising:

(a) providing muscle-derived cells (MDCs) which generate genitourinary tract tissue when introduced into a muscle tissue of the genitourinary tract selected from sphincter, urethra muscle tissue, or a combination thereof, wherein said MDCs comprise an end population of viable, non-adhering, non-fibroblast, desmin-positive cells having a round morphology, and wherein the end population of MDCs is isolated from a suspension of skeletal muscle cells following successive plating, transfer and culture of non-adherent skeletal muscle cells after initial removal of adherent fibroblasts, until the end population of MDCs remains in culture; and

(b) introducing the MDCs of step (a) into a site of genitourinary tract tissue selected from sphincter or urethra muscle tissue, or a combination thereof, wherein the MDCs repopulate, regenerate and repair the injured, damaged, or dysfunctional genitourinary tract tissue.

120. (New) The method according to claim 119, wherein the MDCs are autologous to a host in need of treatment.

121. (New) The method according to claim 119, wherein the MDCs contain a heterologous polynucleotide encoding a bioactive molecule selected from the group consisting of protein, polypeptide, peptide, drug, enzyme, hormone and metabolite, resulting in the production of the bioactive molecule in and around the injured, damaged, or dysfunctional genitourinary tract tissue, and further wherein production of the bioactive molecule is sustained in the injured, damaged, or dysfunctional genitourinary tract tissue to enhance the treatment of stress urinary incontinence.

122. (New) The method according to claim 121, wherein the bioactive molecule is inducible nitric oxide synthase (iNOS).

123. (New) The method according to claim 119, further comprising introducing the same or different MDCs containing a heterologous polynucleotide encoding a cytokine or a growth factor, wherein the cytokine or a growth factor is produced by the MDCs in and around the injured tissue, and further wherein the production of the cytokine or growth factor is sustained in the injured tissue to ameliorate treatment of stress urinary incontinence.

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124. (New) The method according to claim 123, wherein the cytokine or growth factor is insulin-like growth factor (IGF).

125. (New) The method according to claim 121 or claim 123, wherein the MDCs are transduced with a viral vector containing the heterologous polynucleotide, or are transfected with plasmid DNA containing the heterologous polynucleotide.

126. (New) The method according to claim 125, wherein the viral vector is selected from the group consisting of adenovirus, herpes simplex virus, adeno-associated virus, and retrovirus.

127. (New) The method according to claim 121 or claim 123, further comprising introducing the same or different MDCs containing a heterologous polynucleotide encoding interleukin-1 receptor antagonist immune suppression factor, wherein the immune suppression factor is produced by the introduced MDCs in and around the tissue, and further wherein the production of the immune suppression factor is sustained in the tissue to allow survival of the introduced cells and prevent an adverse immune response to the introduced cells.

128. (New) The method according to claim 119, further comprising: culturing the MDCs obtained according to step (a) under conditions allowing for their proliferation, differentiation, or a combination thereof, prior to said introducing step (b).

129. (New) The method according to claim 119, wherein the MDCs obtained in step (a) are subcloned to obtain a clonal cell population prior to said introducing step (b).

130. (New) A method of treating stress urinary incontinence by repairing sphincter muscle tissue injury, damage, or dysfunction, comprising:

(a) providing muscle-derived cells (MDCs) which generate sphincter muscle tissue when introduced into the sphincter muscle, wherein said MDCs comprise an end population of viable, non-adhering, non-fibroblast, desmin-positive cells having a round morphology, and wherein the end population of MDCs is isolated from a suspension of skeletal muscle cells following successive plating, transfer and culture of non-adherent skeletal muscle cells after initial removal of adherent fibroblasts, until the end population of MDCs remains in culture; and

(b) introducing the MDCs of step (a) into a site of the sphincter muscle tissue, wherein the MDCs repopulate, regenerate and repair the injured, damaged, or dysfunctional sphincter muscle tissue so as to treat stress urinary incontinence.

131. (New) The method according to claim 130, wherein the MDCs are autologous to a host in need of treatment.

132. (New) The method according to claim 130, wherein the MDCs contain a heterologous polynucleotide encoding a bioactive molecule selected from the group consisting of protein, polypeptide, peptide, drug, enzyme, hormone and metabolite, resulting in the production of the bioactive molecule in and around the injured or damaged tissue, and further wherein production of the bioactive molecule is sustained in the injured, damaged, or dysfunctional sphincter muscle tissue to enhance repair of stress urinary incontinence.

133. (New) The method according to claim 132, wherein the bioactive molecule is inducible nitric oxide synthase (iNOS).

134. (New) The method according to claim 130, further comprising introducing the same or different MDCs containing a heterologous polynucleotide encoding a cytokine or a growth factor, wherein the cytokine or growth factor is produced by the MDCs in and around the injured tissue, and further wherein the production of the cytokine or growth factor is sustained in the injured tissue to ameliorate treatment of stress urinary incontinence.

135. (New) The method according to claim 134, wherein the cytokine or growth factor is insulin-like growth factor (IGF).

136. (New) The method according to claim 132 or claim 134, wherein the MDCs are transduced with a viral vector containing the heterologous polynucleotide, or are transfected with plasmid DNA containing the heterologous polynucleotide.

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137. (New) The method according to claim 136, wherein the viral vector is selected from the group consisting of adenovirus, herpes simplex virus, adeno-associated virus, and retrovirus.

138. (New) The method according to claim 132 or claim 134, further comprising introducing the same or different MDCs containing a heterologous polynucleotide encoding interleukin-1 receptor antagonist immune suppression factor, wherein the immune suppression factor is produced by the introduced MDCs in and around the tissue, and further wherein the production of the immune suppression factor is sustained in the tissue to allow survival of the introduced cells and to prevent an adverse immune response to the introduced cells.

139. (New) The method according to claim 130, further comprising:
culturing the MDCs obtained according to step (a) under conditions allowing for their proliferation, differentiation, or a combination thereof, prior to said introducing step (b).

140. (New) The method according to claim 130, wherein the MDCs obtained in step (a) are subcloned to obtain a clonal cell population prior to said introducing step (b).

141. (New) A method of treating stress urinary incontinence by repairing urethral muscle tissue injury, damage, or dysfunction, comprising:

(a) providing muscle-derived cells (MDCs) which generate urethral muscle tissue when introduced into the urethral muscle tissue, wherein said MDCs comprise an end population of viable, non-adhering, non-fibroblast, desmin-positive cells having a round morphology, and wherein the end population of MDCs is isolated from a suspension of skeletal muscle cells following successive plating, transfer and culture of non-adherent skeletal muscle cells after initial removal of adherent fibroblasts, until the end population of MDCs remains in culture; and

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(b) introducing the MDCs of step (a) into a site of the urethral muscle tissue, wherein the MDCs repopulate, regenerate and repair the injured, damaged, or dysfunctional urethral muscle tissue so as to treat stress urinary incontinence.

142. (New) The method according to claim 141, wherein the MDCs are autologous to a host in need of treatment.

143. (New) The method according to claim 141, wherein the MDCs contain a heterologous polynucleotide encoding a bioactive molecule selected from the group consisting of protein, polypeptide, peptide, drug, enzyme, hormone and metabolite, resulting in the production of the bioactive molecule in and around the injured or damaged tissue, and further wherein production of the bioactive molecule is sustained in the injured, damaged, or dysfunctional urethral muscle tissue to enhance treatment of stress urinary incontinence.

144. (New) The method according to claim 143, wherein the bioactive molecule is inducible nitric oxide synthase (iNOS).

145. (New) The method according to claim 141, further comprising introducing the same or different MDCs containing a heterologous polynucleotide encoding a cytokine or a growth factor, wherein the cytokine or growth factor is produced by the

MDCs in and around the tissue, and further wherein the production of the cytokine or growth factor is sustained in the tissue to ameliorate treatment of stress urinary incontinence.

146. (New) The method according to claim 145, wherein the cytokine or the growth factor is insulin-like growth factor (IGF).

147. (New) The method according to claim 143 or claim 145, wherein the MDCs are transduced with a viral vector containing the heterologous polynuceotide, or are transfected with plasmid DNA containing the heterologous polynucleotide.

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148. (New) The method according to claim 147, wherein the viral vector is selected from the group consisting of adenovirus, herpes simplex virus, adeno-associated virus, and retrovirus.

149. (New) The method according to claim 143 or claim 145, further comprising introducing the same or different MDCs containing a heterologous polynucleotide encoding interleukin-1 receptor antagonist immune suppression factor, wherein the immune suppression factor is produced by the introduced MDCs in and around the tissue, and further wherein the production of the immune suppression factor is sustained in the tissue to allow survival of the introduced cells and to prevent an adverse immune response to the introduced cells.

150. (New) The method according to claim 141, further comprising:
culturing the MDCs obtained according to step (a) under conditions allowing for their proliferation, differentiation, or a combination thereof, prior to said introducing step (b).

151. (New) The method according to claim 141, wherein the MDCs obtained in step (a) are subcloned to obtain a clonal cell population prior to said introducing step (b).

152. (New) A method of repairing injured, damaged, or dysfunctional genitourinary tract tissue associated with urinary incontinence, comprising:

(a) introducing muscle-derived cells (MDCs) into genitourinary tract tissue selected from one or more of the group consisting of sphincter muscle tissue, bladder muscle tissue, detrusor muscle tissue and urethral muscle tissue; said MDCs comprising an end population of viable, non-adhering, non-fibroblast, desmin-positive cells having a round morphology, and wherein the end population of MDCs is isolated from a suspension of skeletal muscle cells following successive plating, transfer and culture of non-adherent skeletal muscle cells after initial removal of adherent fibroblasts, until the end population of MDCs remains in culture; and

(b) determining the presence of said MDCs in and around the genitourinary tract muscle tissue into which the MDCs were introduced, wherein said MDCs repopulate, survive and regenerate in the muscle tissue to repair the genitourinary tract tissue injury, damage, or dysfunction associated with urinary incontinence.

153. (New) The method according to claim 152, wherein the MDCs are autologous to a host in need of treatment.

154. (New) The method according to claim 152, wherein the MDCs contain a vector containing a heterologous polynucleotide encoding human inducible nitric oxide synthase (iNOS), wherein the inducible nitric oxide synthase (iNOS) is expressed by the MDCs, thereby resulting in increased production and release of nitric oxide by the injected MDCs into the tissue to modulate muscle contractility so as to treat the urinary incontinence.

155. (New) The method according to claim 154, wherein the MDCs are transduced with a replication-defective viral vector containing the heterologous polynucleotide encoding inducible nitric oxide synthase (iNOS).

156. (New) The method according to claim 155, wherein the viral vector is selected from the group consisting of adenovirus, herpes simplex virus, adeno-associated virus and retrovirus.

157. (New) The method according to claim 152, further comprising introducing the same or different MDCs containing a heterologous polynucleotide encoding a cytokine or a growth factor, wherein the cytokine or growth factor is produced by the MDCs in and around the injured tissue, and further wherein the production of the cytokine or growth factor is sustained in the injured tissue to ameliorate repair of the genitourinary tract tissue so as to treat the urinary incontinence.

158. (New) The method according to claim 157, wherein the cytokine or growth factor is insulin-like growth factor (IGF).

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159. (New) The method according to claim 154 or claim 157, further comprising introducing the same or different MDCs containing a heterologous polynucleotide encoding interleukin-1 receptor antagonist immune suppression factor, wherein the immune suppression factor is produced by the introduced MDCs in and around the tissue, and further wherein the production of the immune suppression factor is sustained in the tissue to allow survival of the introduced cells and to prevent an adverse immune response to the introduced cells.

160. (New) The method according to claim 152, further comprising:

culturing the MDCs obtained according to step (a) under conditions allowing for their proliferation, differentiation, or a combination thereof, prior to said introducing step (b).

161. (New) The method according to claim 152, wherein the MDCs obtained in step (a) are subcloned to obtain a clonal cell population, wherein the clonal cell population of MDCs are introduced into a host in need of treatment.

162. (New) A method of repairing injured, damaged, or dysfunctional bladder contractility associated with urinary incontinence, comprising:

(a) providing muscle-derived cells (MDCs) which generate bladder muscle cells when introduced into bladder or detrusor muscle, wherein said MDCs comprise an end population of viable, non-adhering, non-fibroblast, desmin-positive cells having a round morphology, and wherein the end

population of MDCs is isolated from a suspension of skeletal muscle cells following successive plating, transfer and culture of non-adherent skeletal muscle cells after initial removal of adherent fibroblasts, until the end population of MDCs remains in culture; and

(b) introducing the MDCs of step (a) into a site of the bladder or detrusor muscle wall, wherein the MDCs regenerate bladder muscle cells to repair the injured, damaged, or dysfunctional bladder contractility associated with urinary incontinence.

163. (New) The method according to claim 162, wherein the MDCs contain a heterologous polynucleotide encoding inducible nitric oxide synthase (iNOS) resulting in the production of iNOS in and around the bladder muscle tissue, and further wherein production of iNOS is sustained in the area of the bladder to enhance repair.

164. (New) The method according to claim 162, further comprising introducing the same or different MDCs containing a heterologous polynucleotide encoding a cytokine or a growth factor that is functional in bladder tissue, wherein the cytokine or growth factor is produced by the MDCs in and around the bladder tissue, and further wherein the production of the trophic factor is sustained in the bladder tissue to restore bladder contractility.

165. (New) The method according to claim 164, wherein the cytokine or the growth factor is insulin-like growth factor (IGF).

166. (New) The method according to claim 163 or claim 164, wherein the MDCs are transduced with a viral vector containing the heterologous polynucleotide, or are transfected with plasmid DNA containing the heterologous polynucleotide.

167. (New) The method according to claim 166, wherein the viral vector is selected from the group consisting of adenovirus, herpes simplex virus, adeno-associated virus, and retrovirus.

168. (New) The method according to claim 162, further comprising introducing the same or different MDCs containing a heterologous polynucleotide encoding interleukin-1 receptor agonist immune suppression factor, wherein the immune suppression factor is produced by the introduced MDCs in and around the bladder, and further wherein the production of the immune suppression factor is sustained in the bladder to allow survival of the introduced cells and to prevent an adverse immune response to the introduced cells.

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169. (New) A method of repairing sphincter muscle injury, damage, or dysfunction associated with stress urinary incontinence, comprising:

(a) obtaining muscle-derived cells (MDCs) from a subject, wherein obtaining the MDCs comprises isolating skeletal muscle cells; plating a suspension of the skeletal muscle cells in collagen-coated containers; and successively transferring and culturing the non-adherent cells following initial removal of adherent fibroblasts until only an end population of viable, non-fibroblast, non-adhering, desmin-positive MDCs of round morphology remains in culture; and

(b) introducing into the sphincter muscle of an individual in need thereof the MDCs of step (a) in an amount effective to repair sphincter muscle injury, damage, or dysfunction; wherein the introduced MDCs regenerate and repair the injured, damaged, or dysfunctional sphincter muscle.

170. (New) A method of repairing urethral muscle injury, damage, or dysfunction associated with stress urinary incontinence, comprising:

(a) obtaining muscle-derived cells (MDCs) from a subject, wherein obtaining the MDCs comprises isolating skeletal muscle cells; plating a suspension of the skeletal muscle cells in collagen-coated containers; and successively transferring and culturing the non-adherent cells following initial removal of adherent fibroblasts until only an end population of viable, non-fibroblast, non-adhering, desmin-positive MDCs of round morphology remains in culture; and

(b) introducing into the urethral tissue of an individual in need thereof the MDCs of step (a) in an amount effective to repair urethral muscle injury, damage, or dysfunction; wherein the introduced MDCs regenerate and repair the injured, damaged, or dysfunctional urethral muscle.

171. (New) The method according to claim 169 or 170, further comprising: culturing the MDCs of step (a) under conditions allowing for their proliferation, differentiation, or combination thereof, prior to said introducing step (b).

172. (New) The method according to claim 169 or 170, wherein the MDCs obtained in step (a) are subcloned to obtain a clonal cell population that is used in the introducing step (b).

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173. (New) The method according to claim 169 or 170, wherein the MDCs contain a nucleic acid molecule encoding one or more heterologous, bioactive gene products selected from inducible nitric oxide synthase, insulin-like growth factor, or a combination thereof.

174. (New) The method according to claim 173, wherein the MDCs are transduced with a viral vector containing a nucleic acid molecule encoding one or more heterologous bioactive gene products, or are transfected with plasmid DNA containing a nucleic acid molecule encoding the one or more heterologous bioactive gene products.

175. (New) The method according to claim 174, wherein the viral vector is selected from the group consisting of adenovirus, herpes simplex virus, adeno-associated virus, and retrovirus.

176. (New) The method according to claim 169 or 170, further comprising introducing the same or different MDCs containing a heterologous polynucleotide encoding interleukin-1 receptor agonist immune suppression factor, wherein the immune suppression factor is produced by the introduced MDCs in and around the injured muscle, and further wherein the production of the immune suppression factor is

sustained in the injured muscle to allow survival of the introduced cells and to prevent an adverse immune response to the introduced cells.

177. (New) The method according to claim 169 or 170, wherein the MDCs are autologous to the individual in need of treatment.

178. (New) The method according to claim 169 or 170, wherein the MDCs are histocompatibly-matched with the indivdual in need of treatment.

179. (New) A method of repairing injured, damaged, or dysfunctional genitourinary tract tissue by enhancing coaptation and bulk of the genitourinary tract tissue to treat stress urinary incontinence, comprising:

(a) obtaining muscle-derived cells (MDCs) from a subject, wherein obtaining the MDCs comprises isolating skeletal muscle cells; plating a suspension of the skeletal muscle cells in collagen-coated containers; and successively transferring and culturing the non-adherent cells following initial removal of adherent fibroblasts until only an end population of viable, non-fibroblast, non-adhering, desmin-positive MDCs of round morphology remains in culture; and

(b) introducing the MDCs of step (a) into the injured, damaged, or dysfunctional genitourinary tract tissue of an individual in need thereof, said tissue selected from sphincter, urethra, or a combination thereof, in an amount effective to repair the injured, damaged, or dysfunctional genitourinary tract tissue, wherein the introduced MDCs enhance coaptation and bulking of the sphincter, urethra, or combination, genitourinary tract tissue to repair injured, damaged, or dysfunctional genitourinary tract tissue so as to treat stress urinary incontinence.

180. (New) The method according to claim 179, further comprising: culturing the MDCs of step (a) under conditions allowing for their proliferation, differentiation, or a combination thereof prior to said introducing step (b).

181. (New) The method according to claim 179, wherein the MDCs obtained in step (a) are subcloned to obtain a clonal cell population that is introduced into the tissue.

182. (New) The method according to claim 179, wherein the MDCs contain a nucleic acid molecule encoding one or more heterologous, bioactive gene products selected from a cytokine or a growth factor.

183. (New) The method according to claim 182, wherein the bioactive gene product is insulin-like growth factor (IGF).

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184. (New) The method according to claim 179, wherein the MDCs are histocompatibly-matched with the individual in need of said cells.

185. (New) The method according to claim 182, wherein the MDCs are transduced with a viral vector containing a nucleic acid molecule encoding one or more heterologous bioactive gene products, or are transfected with plasmid DNA containing a nucleic acid molecule encoding one or more heterologous bioactive gene products.

186. (New) The method according to claim 185, wherein the viral vector is selected from the group consisting of adenovirus, herpes simplex virus, adeno-associated virus, and retrovirus.

187. (New) The method according to claim 179, further comprising introducing the same or different MDCs containing a heterologous polynucleotide encoding interleukin-1 receptor agonist immune suppression factor, wherein the immune suppression factor is produced by the introduced MDCs in and around the tissue, and further wherein the production of the immune suppression factor is sustained in the tissue to allow survival of the introduced cells and to prevent an adverse immune response to the introduced cells.

188. (New) A method of repairing bladder tissue injury, damage, or dysfunction, comprising:

(a) introducing muscle-derived cells (MDCs) into bladder or detrusor tissue; said MDCs comprising an end population of viable, non-adhering, non-fibroblast, desmin-positive cells having a round morphology, and wherein the end population of MDCs is isolated from a suspension of skeletal muscle cells following successive plating, transfer and culture of non-adherent skeletal muscle cells after initial removal of adherent fibroblasts until the end population of MDCs remains in culture; and

(b) determining the presence of said MDCs in and around the bladder or detrusor tissue into which the MDCs were introduced, wherein said MDCs repopulate, survive and regenerate in the bladder tissue to repair the bladder injury, damage, or dysfunction.

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189. (New) A method of treating stress urinary incontinence by repairing sphincter tissue injury, damage, or dysfunction, comprising:

(a) introducing muscle-derived cells (MDCs) into sphincter tissue; said MDCs comprising an end population of viable, non-adhering, non-fibroblast, desmin-positive cells having a round morphology, and wherein the end population of MDCs is isolated from a suspension of skeletal muscle cells following successive plating, transfer and culture of non-adherent skeletal muscle cells after initial removal of adherent fibroblasts until the end population of MDCs remains in culture; and

(b) determining the presence of said MDCs in and around the sphincter tissue into which the MDCs were introduced, wherein said MDCs repopulate, survive and regenerate in the sphincter tissue to repair the sphincter injury, damage, or dysfunction so as to treat stress urinary incontinence.

190. (New) A method of treating stress urinary incontinence by repairing urethral tissue injury, damage, or dysfunction, comprising:

(a) introducing muscle-derived cells (MDCs) into urethral tissue; said MDCs comprising an end population of viable, non-adhering, non-fibroblast, desmin-positive cells having a round morphology, and wherein the end

population of MDCs is isolated from a suspension of skeletal muscle cells following successive plating, transfer and culture of non-adherent skeletal muscle cells after initial removal of adherent fibroblasts until the end population of MDCs remains in culture; and

(b) determining the presence of said MDCs in and around the urethral tissue into which the MDCs were introduced, wherein said MDCs repopulate, survive and regenerate in the urethral tissue to repair the urethral injury, damage, or dysfunction so as to treat stress urinary incontinence.

191. (New) The method according to any one of claims 188, 189, or 190, wherein the MDCs contain a vector containing a heterologous polynucleotide encoding a heterologous protein, polypeptide, or peptide selected from human inducible nitric oxide synthase (iNOS), or insulin-like growth factor (IGF), wherein the heterologous polynucleotide is expressed by the transformed MDCs, thereby resulting in production of the encoded protein, polypeptide, or peptide by the MDCs into the tissue to enhance treatment of stress urinary incontinence.

192. (New) The method according to any one of claims 188, 189, or 190, wherein the MDCs are autologous to a host being treated.

193. (New) The method according to claim 191, wherein the MDCs are transduced with a replication-defective viral vector containing the heterologous polynucleotide.

194. (New) The method according to claim 193, wherein the viral vector is selected from the group consisting of adenovirus, herpes simplex virus, adeno-associated virus and retrovirus.

195. (New) The method according to any one of claims 188, 189, or 190, wherein the MDCs are histocompatibly-matched with an individual in need of said cells.